

2. A stiffener as claimed in claim 1, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

3. A stiffener as claimed in claim 1, the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material, is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

4. A stiffener as claimed in claim 1, the stiffener being planar for mounting to a die-side major planar surface of the substrate.

5. A stiffener as claimed in claim 1, the stiffener having an internal window therein to provide clearance for at least one of a die, under-fill, die side components (DSC), and integrated heat spreader (IHS).

6. A stiffener as claimed in claim 1, the stiffener being a multi-part stiffener.

7. A stiffener as claimed in claim 1, the stiffener having an above-substrate-plane height when mounted, which is less-than or equal to an above-substrate-plane height, when mounted, of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

8. A stiffener as claimed in claim 1, the stiffener having a top surface above a substrate-plane when mounted, which is substantially co-planar with, when mounted, a top surface of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader.

9. (Amended) A stiffener as claimed in claim 8, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

10. A stiffener as claimed in claim 1, where if a main body of the stiffener is electrically conductive, the stiffener further includes an insulator to electrically insulate electrical members on stiffener opposing areas of the substrate.

11. A stiffener as claimed in claim 1, the stiffener being an edge stiffener for mounting to minor-planar side-surfaces of the substrate.

12. (Amended) A stiffener as claimed in claim 1, the edge stiffener having a non-flat cross section mate-able with the side-surfaces of the substrate.

13. (Amended) A stiffener as claimed in claim 1, where the edge stiffener is pre-attachable to the substrate by an IC-PCB carrier package manufacturer.

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14. A thin-core or coreless integrated circuit printed circuit board (IC-PCB) carrier package comprising: a stiffener to provide stiffening support to one of a thin-core and coreless substrate of the IC-PCB carrier package.

15. An IC-PCB carrier package as claimed in claim 14, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

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16. An IC-PCB carrier package as claimed in claim 14, where the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material, is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

17. An IC-PCB carrier package as claimed in claim 14, the stiffener being planar and mounted to a die-side major planar surface of the substrate.

18. An IC-PCB carrier package as claimed in claim 14, the stiffener having an internal window therein to provide clearance for at least one of a die, under-fill, die side components (DSC), and integrated heat spreader (IHS).

19. An IC-PCB carrier package as claimed in claim 14, the stiffener being a multi-part stiffener.

Sub B' 20. An IC-PCB carrier package as claimed in claim 14, the stiffener having an above-substrate-plane height, which is less-than or equal to an above-substrate-plane height, when mounted, of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

al Cont 21. An IC-PCB carrier package as claimed in claim 14, the stiffener having a top surface above a substrate-plane, which is substantially co-planar with, when mounted, a top surface of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader.

22. (Amended) An IC-PCB carrier package as claimed in claim 21, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

23. An IC-PCB carrier package as claimed in claim 14, where if a main body of the stiffener is electrically conductive, the stiffener further includes an insulator to electrically insulate electrical members on stiffener-opposing areas of the substrate.

24. An IC-PCB carrier package as claimed in claim 14, the stiffener being an edge stiffener mounted to minor-planar side-surfaces of the substrate.

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25. An IC-PCB carrier package as claimed in claim 14, the edge stiffener having a non-flat cross section which is mated with the side-surfaces of the substrate.

26. An IC-PCB carrier package as claimed in claim 14, where the edge stiffener is pre-attached to the substrate by an IC-PCB carrier package manufacturer.

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27. A packaged integrated circuit (IC) comprising:
a thin-core or coreless integrated circuit printed circuit board (IC-PCB) carrier package comprising a stiffener to provide stiffening support to one of a thin-core and coreless substrate of the IC-PCB carrier package.

28. A packaged IC as claimed in claim 27, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

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29. A packaged IC as claimed in claim 27, where the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material, is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

30. A packaged IC as claimed in claim 27, the stiffener being planar and mounted to a die-side major planar surface of the substrate.

31. A packaged IC as claimed in claim 27, the stiffener having an internal window therein to provide clearance for at least one of a die, under-fill, die side components (DSC), and integrated heat spreader (IHS).

32. A packaged IC as claimed in claim 27, the stiffener being a multi-part stiffener.

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33. A packaged IC as claimed in claim 27, the stiffener having an above-substrate-plane height, which is less-than or equal to an above-substrate-plane height, when mounted, of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

34. A packaged IC as claimed in claim 27, the stiffener having a top surface above a substrate-plane, which is substantially co-planar with, when mounted, a top surface of one of: an IC-die, and a combination of an IC-die with an integrated heat spreader.

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35. (Amended) A packaged IC as claimed in claim 34, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

36. A packaged IC as claimed in claim 27, where if a main body of the stiffener is electrically conductive, the stiffener further includes an insulator to electrically insulate electrical members on stiffener-opposing areas of the substrate.

37. A packaged IC as claimed in claim 27, the stiffener being an edge stiffener mounted to minor-planar side-surfaces of the substrate.

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38. A packaged IC as claimed in claim 27, the edge stiffener having a non-flat cross section which is mated with the side-surfaces of the substrate.

39. A packaged IC as claimed in claim 27, where the edge stiffener is pre-attached to the substrate by an IC-PCB carrier package manufacturer.

Please add the following new claims.

40. (New) A stiffener member disposable onto at least one of a thin-core and coreless substrate of an integrated circuit printed circuit board (IC-PCB) carrier package to provide stiffening support thereto.

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41. (New) A stiffener as claimed in claim 40, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

42. (New) A stiffener as claimed in claim 40, the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material,

is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

43. (New) A stiffener as claimed in claim 40, the stiffener being planar for mounting to a die-side major planar surface of the substrate.

44. (New) A stiffener as claimed in claim 40, the stiffener being a multi-part stiffener.

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45. (New) A stiffener as claimed in claim 40, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

46. (New) A thin-core or coreless integrated circuit printed circuit board (IC-PCB) carrier package comprising: a stiffener secured onto at least one of a thin-core and coreless substrate of the integrated circuit printed circuit board (IC-PCB) carrier package to provide stiffening support thereto.

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47. (New) An IC-PCB carrier package as claimed in claim 46, the IC-PCB carrier package being one of a flip chip pin grid array (FC-PGA) and a flip chip ball grid array (FC-BGA) carrier package.

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48. (New) An IC-PCB carrier package as claimed in claim 46, the stiffener is substantially made of at least one of a metal-like, plastic-like, glass-like and ceramic-like material, is one of a molded, stamped, etched, extruded and deposited stiffener, and is capable of withstanding high temperatures of at least one of an IC die bonding operation and normal IC operation.

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49. (New) An IC-PCB carrier package as claimed in claim 46, the stiffener being planar for mounting to a die-side major planar surface of the substrate.

50. (New) An IC-PCB carrier package as claimed in claim 46, the stiffener being a multi-part stiffener.

51. (New) An IC-PCB carrier package as claimed in claim 46, the stiffener being disposable to co-support a heat sink, with one of: an IC-die, and a combination of an IC-die with an integrated heat spreader (IHS).

REMARKS

This paper is responsive to the paper(s) indicated above, and is responsive in any other manner indicated below.

RESTRICTION/ELECTION REQUIREMENT - TRAVERSED

A restriction/election requirement has been made for the reasons beginning on page 2 of the Office Action. Applicant respectfully traverses based upon the following grounds.